GROUP 12

ENGINE LUBRICATION

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GENERAL INFORMATION

M1121000100829

The lubrication method is a fully force-fed, full-flow filtration type.

Item	Specification
Oil pump type	Gear type
Drive method	Crankshaft

ENGINE OILS

⚠ ***WARNING***

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

Recommended Precautions

The most effective precaution is to adapt working practices which prevent, as far as practicable, the risk of skin contact with mineral oils, for example by using enclosed systems for handling used engine oil and by degreasing components, where practicable, before handling them. Other precautions:

Other precautions:

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Avoid contaminating clothes, particularly underpants, with oil.
- Do not put oily rags in pockets, the use of overalls without pockets will avoid this.
- Do not wear heavily soiled clothing and oil-impregnated foot-wear. Overalls must be cleaned regularly and kept separate from personal clothing.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.
- Obtain first aid treatment immediately for open cuts and wounds.
- Wash regularly with soap and water to ensure all oil is removed, especially before meals (skin cleansers and nail brushes will help). After cleaning, the application of preparations containing lanolin to replace the natural skin oils is advised.
- Do not use petrol, kerosine, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin after work.
- If skin disorders develop, obtain medical advice without delay.

SERVICE SPECIFICATIONS

M1121000300544

ITEM		STANDARD VALUE
Engine oil pressure kPa (psi)	at idle	29 (4.2) or more
	at 3,500 r/min	294 –686 (43 –100)

TSB Revision

SEALANT

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ITEM	SPECIFIED SEALANT
Engine oil pressure switch	THREE BOND 1141E, 1215 or 1212D or equivalent

LUBRICANTS

M1121000401298

Item	Engine oil	Quantity dm^3 (qt)
Oil filter	Engine oils displaying ILSAC certification symbol ("Starburst" symbol) or conforming to the API classification SM or higher	0.3 (0.32)
Total quantity		4.3 (4.52)

ENGINE OIL

⚠ CAUTION

Never use nondetergent or straight mineral oil.

Use only engine oils displaying the ILSAC certification symbol ("Starburst" symbol) on the container.

ILSAC certification symbol ("Starburst" symbol)

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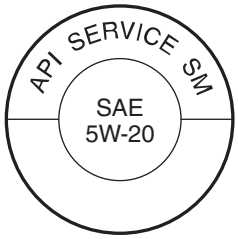
If these oils are not available, an API classification SM or higher can be used.

API service symbol



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SPECIAL TOOLS

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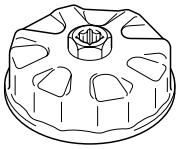
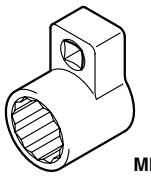
Tool	Tool number and name	Supersession	Application
 B991396	MB991396 Oil filter wrench	Oil filter wrench	Removal and installation of engine oil filter (When using oil filter MD360935)
 MB992118	MB992118 Oil pressure switch wrench	Oil pressure switch wrench	Removal and installation of engine oil pressure switch

ON-VEHICLE SERVICE

ENGINE OIL CHECK

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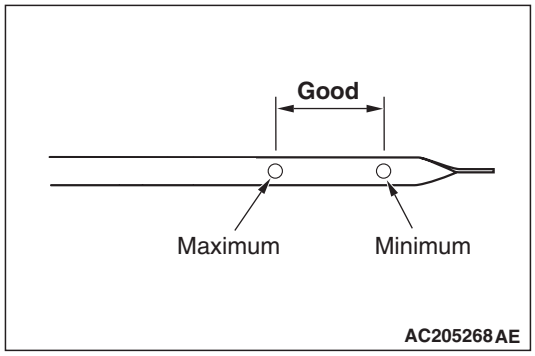


1. Pull out the oil dipstick, clean off the engine oil on the oil dipstick, and then reinsert the oil dipstick.
2. Pull out the oil dipstick, and check the engine oil level is within the marks on one side of the oil dipstick (engine cover side).

   NOTE:
   - *Checking the oil might be difficult shortly after stopping the engine or engine oil replacement.*
   - *If difficult, take some time (approx. 30 sec.) and try again.*
   - *Refer to the information label indicating the engine oil check process on the rocker cover.*
3. Check that the engine oil is not excessively dirty, that there is no coolant or gasoline mixed in, and that it is sufficiently thick and slippery.

ENGINE OIL REPLACEMENT

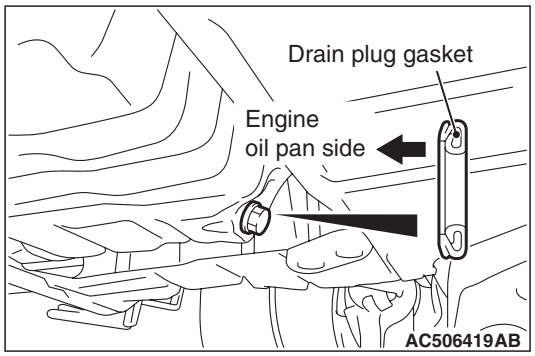
M1121001001442

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80 –90° C (176 –194° F).

⚠ WARNING

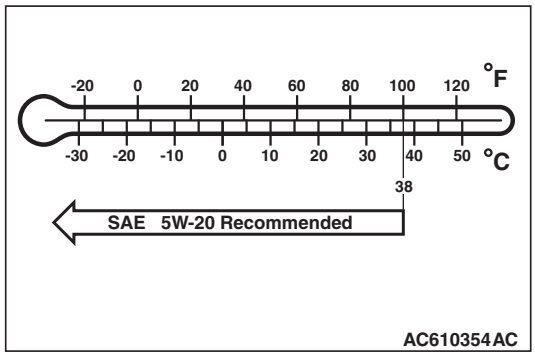
Use care as oil could be hot.

2. Remove the engine oil filler cap.
3. Remove the drain plug to drain oil.



4. Install a new drain plug gasket so that it faces in the direction shown in the illustration, and then tighten the drain plug to the specified torque.

   Tightening torque: 39 ±5 N· m (29 ±3 ft-lb)



5. Refill the specified quantity of oil.

   Specified Engine Oil: Engine oils displaying ILSAC certification symbol ("Starburst" symbol) or conforming to the API classification SM or higher

   Total quantity: 4.3 dm^3 (4.52 quarts)

   NOTE: SAE 5W-20 engine oil is strongly recommended for optimum fuel economy and cold starting. SAE 10W-30 may be used when the normal operating temperature is above 38°C (100°F).
6. Install the engine oil filler cap.
7. Let the engine run for a few minutes.
8. Stop the engine, and then check the oil level using the oil dipstick after a few minutes.

ENGINE OIL FILTER REPLACEMENT

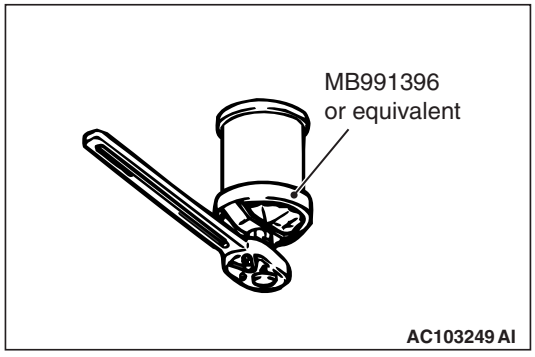
M1121001101018

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80 –90° C (176 –194° F)

⚠ WARNING

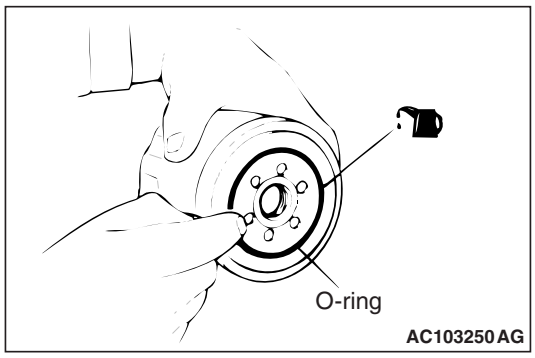
Use care as oil could be hot.

2. Remove the engine oil filler cap.
3. Remove the drain plug to drain oil.
4. Use the respective tool in the following table to remove the engine oil filter.



Number	Special tool
MD360935	Oil filter wrench (MB991396) or equivalent

5. Clean the filter bracket side mounting surface and ensure the old O-ring has been removed.



6. Apply a small amount of engine oil to the O-ring of the new oil filter.
7. Screw on the oil filter by hand until it touches the surface of the flange and then tighten it with an oil filter wrench.

Number	Special tool	Tightening torque
MD360935	MB991396 or equivalent	Approximately 3/4 turn [14 ±2 N· m (124 ±18 in-lb)]

8. Install the drain plug and refill engine oil (Refer to P.12-4).
9. Rev the engine a few times, and check to be sure that no engine oil leaks at the oil filter.

OIL PRESSURE CHECK

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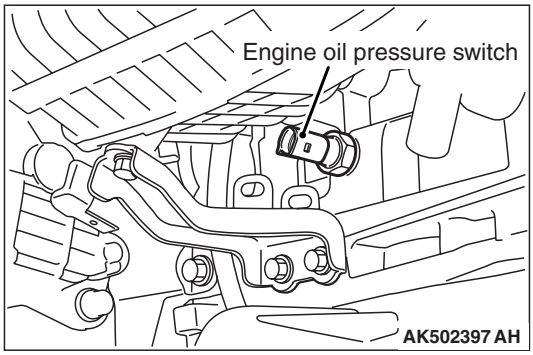

1. Check engine oil level.
2. Remove the engine oil pressure switch. (Refer to Oil Pressure Switch Removal And Installation P.12-7.)
3. Install the engine oil pressure gauge.

   NOTE: Use a 1/8 pipe thread adapter.
4. Run the engine to warm it.
5. After the engine has been warmed up, check that engine oil pressure is within the standard value.

   Standard value:
   At idle: 29 kPa (4.2 psi) or more
   At 3,500 r/min: 294 –686 kPa (43 –100 psi)
6. Remove the engine oil pressure gauge.
7. Install the engine oil pressure switch. (Refer to Oil Pressure Switch Removal And Installation P.12-7.)

REMOVAL AND INSTALLATION

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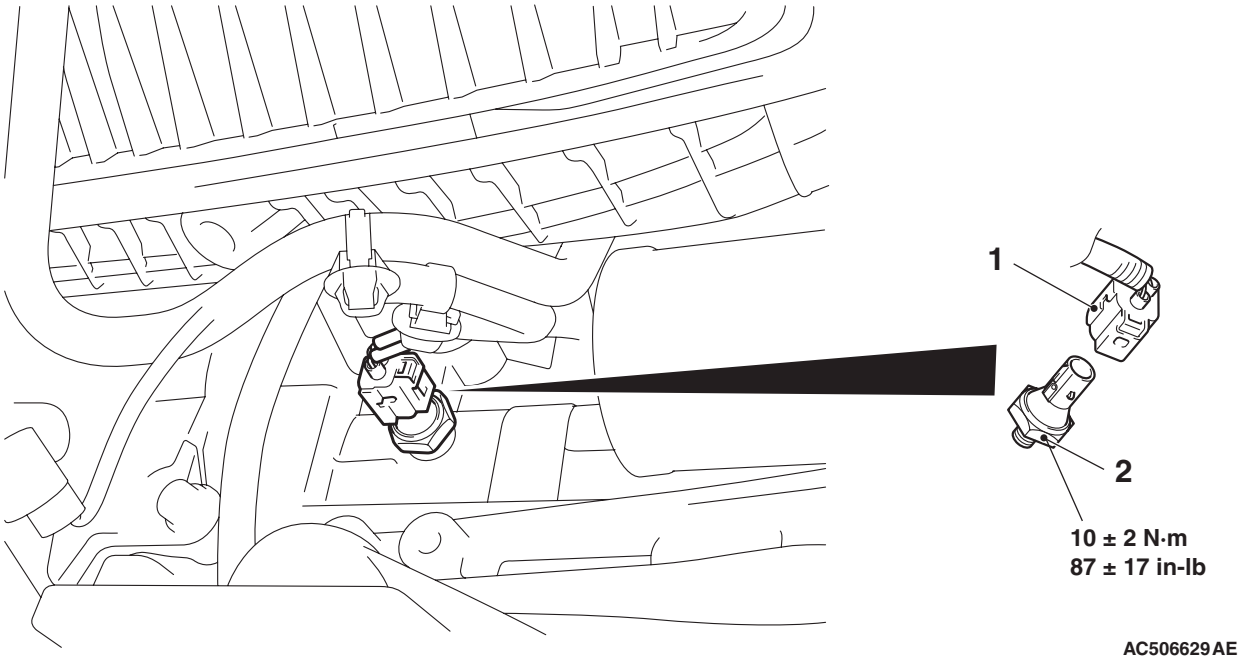
Pre-removal and post-installation operation
- Engine Room Under Cover Front Removal and Installation (Refer to GROUP 51 –Under Cover P.51-16).
- Intake Manifold Stay Removal and Installation (Refer to GROUP 15 –Intake Manifold P.15-5).
- Vacuum Hose Removal and Installation (Refer to GROUP 35A –Master Cylinder Assembly and Brake Booster P.35A-36).
- Emission Vacuum Hose Removal and Installation (Refer to GROUP 15 –Intake Manifold P.15-5).



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Removal steps

<<A>> • Throttle body mounting bolts (Refer to Group 13A –Throttle body assemblyP.13A-950)

1. Oil pressure switch connector

<<B>> >>A<< 2. Oil pressure switch

Required Special Tool:
- MB992118: Oil Pressure Switch Wrench

REMOVAL SERVICE POINT

<<A>> THROTTLE BODY MOUNTING BOLTS REMOVAL

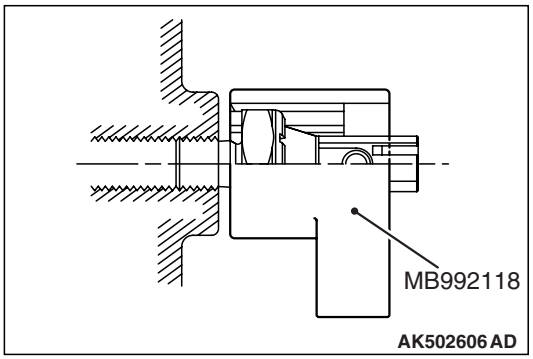
Remove the throttle body mounting bolts and put the throttle body aside so as not to interfere the oil pressure switch connector disconnection.

<<B>> OIL PRESSURE SWITCH REMOVAL

⚠ CAUTION

The sealant is applied to the bolt. Remove the bolt with care not to break it.

Use special tool oil pressure switch wrench (MB992118) to remove the oil pressure switch.



INSTALLATION SERVICE POINT

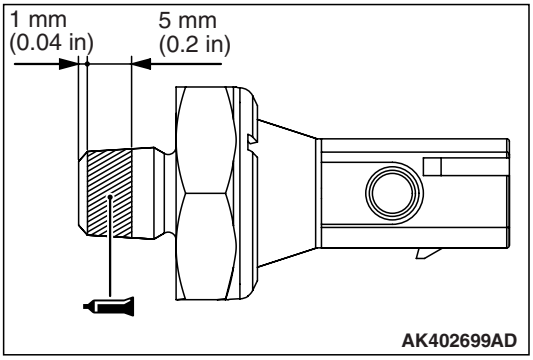
>>A<< OIL PRESSURE SWITCH INSTALLATION

1. Apply sealant to the oil pressure switch thread.

   Specified sealant: Three bond 1141E or equivalent

⚠ CAUTION

Do not start the engine for 1 hour or more after the oil pressure switch installation.



2. In the same manner as removal, use special tool oil pressure switch wrench (MD992118) to tighten the oil pressure switch to the specified torque.

   Tightening torque: 10 ±2 N· m (87 ±17 in-lb)